## REMARKS

### *Summary of the Amendment*

Upon entry of the above amendment, claims 1, 2, 4, and 6 - 9 will have been amended.

Accordingly, claims 1 – 9 currently remain pending.

### *Summary of the Official Action*

In the instant Office Action, the Examiner has rejected claims 1 – 9 over the art of

record. By the present amendment and remarks, Applicants submit that the objections and

rejections have been overcome, and respectfully request reconsideration of the outstanding

Office Action and allowance of the present application.

### *Submission of Certified Copy of Priority Document*

Concurrently herewith, Applicants are submitting a Supplemental Claim of Priority

and a certified copy of the priority document. Accordingly, the Examiner is requested to

acknowledge receipt of the same in the next official communication.

### *Support for Amendments*

Applicants note that support for the previous amendments to claim 1 can be found in

the originally submitted specification:

With regard to multiple objects, support can be found beginning on page 5, line 1 and

continuing throughout the disclosure.

With regard to paragraph (a), the bridging paragraph on pages 8 and 9 and the first full

paragraph on page 9 provide support for the recited subject matter. In this regard, Applicants submit that one ordinarily skilled in the art reviewing the noted paragraphs would readily understand that all pixel points of the received images are roughly classified.

A fair reading of the disclosure in the first fully paragraph on page 14 provides the requisite support for the amendments to paragraphs (c) and (d).

Regarding paragraph (e), support for this amendment can be found in the first full paragraph on page 21.

The bridging paragraph on pages 23 and 24 provide the necessary support for the amendment to paragraph (f).

Moreover, with regard to the instant amendment to the claims, Applicants note that support for these amendment can be found in the bridging paragraph of pages 9 and 10, as well as original claims 2 and 4.

Accordingly, Applicants submit that the amendments to claims are fully supported by the original disclosure, and request acknowledgment of the same in the next official communication from the Examiner.

### *Traversal of Rejection Under 35 U.S.C. §103(a)*

1.      *Over Murray and Lawrence*

Applicants traverse the rejection of claims 1 – 3, 6, and 9 under 35 U.S.C. §103(a) as being unpatentable over MURRAY et al. (U.S. Patent No. 6,597,800) [hereinafter

"MURRAY"] and LAWRENCE et al. (U.S. Patent No. 6,038,337) [hereinafter "LAWRENCE"]. The Examiner asserts that MURRAY teaches a method of multiple object recognition on an image pixel plane of received images that, with the exception of classifiers using a characterizing vector, discloses the recited method. The Examiner further asserts that, as LAWRENCE teaches that each classifier operates based on a characterizing vector forming an input information for its respective classifier, it would have been obvious to modify MURRAY to include characterizing vector of LAWRENCE. Applicants traverse the Examiner's assertions.

Applicants' independent claim 1 recites a method for multiple object recognition on a pixel plane that includes, *inter alia*, roughly classifying all pixel points of said received images according to whether or not a pixel point is relevant for said multiple object recognition, *according to a set of criterion related to a nonhomogeneous vicinity around each particular pixel point*, to eliminate irrelevant pixel points from the relevant pixel points; forming a reduced image based on said relevant pixel points as roughly classified in step (a); filtering each reduced image for forming at least two filtered images whereby image components relevant for said multiple object recognition are retained in said at least two filtered images; further classifying each pixel point of said at least two filtered images for providing classified images, wherein said further classifying is performed by a group of different classifiers which operate in accordance with learned rules *to allocate, with*

*evaluation number, said classified images to different object classes*, wherein each classifier

of said group of different classifiers operates *based on a characterizing vector of a respective*

*filtered image* forming a direct input information for is respective classifier and wherein each

different classifier works independently of any other classifier of said group of different

classifiers; merging, for each pixel point, said classified images in accordance with an

algorithm based on the evaluation numbers to perform a combined global evaluation for each

class of said different object classes for providing merged images; and deciding for each

pixel point, on the basis of said merged images, *whether a pixel point of all remaining pixel*

*points is still relevant and if so to which of said different object classes each relevant pixel*

*point belongs*.    Applicants submit that no proper combination of MURRAY and

LAWRENCE render unpatentable the above-combination of features.

Applicants note that in contrast to the instant invention, MURRAY discloses

segmenting the image according to regions of homogeneity to derive a feature vector.

Moreover, MURRAY sets forth that the feature extraction system is limited to homogeneous

regions of the image that are segmented in either a primary or secondary segmentation. Thus,

as MURRAY is concerned with segmenting regions of the image that are homogeneous,

Applicants submit that this document fails to teach or suggest roughly classifying the pixels

*according to a set of criterion related to a nonhomogeneous vicinity around each particular*

*pixel point.*

In fact, as MURRAY teaches segmentation of homogeneous regions, Applicants submit that this document actually teaches against the recited rough classifying of pixels, as recited in a least independent claim 1. Because MURRAY teaches against the expressly recited feature of the instant invention, this document further fails to provide any teaching or suggestion of the requisite motivation or rationale for modifying MURRAY in any manner that would render unpatentable the instant invention.

Applicants further submit that, as MURRAY teaches against the rough classifying of all pixels, in the manner discussed above, MURRAY cannot even arguably teach or suggest the recited forming of a reduced image based upon the relevant pixel points found through the rough classifying. Further, Applicants note that, as MURRAY fails to show formation of a reduced image, this document also fails to provide any teaching or suggestion of filtering each reduced image, as recited in at least independent claim 1. In this regard, Applicants note that the Examiner has indicated that the filtering of MURRAY is intended to filter homogeneous regions, which are inapplicable to the instant invention. Accordingly, Applicants submit that MURRAY fails to teach or suggest the above-noted features of at least independent claim 1.

In view of the foregoing, as MURRAY fails to teach or suggest the above-noted features, Applicants submit that MURRAY cannot even arguably teach or suggest the recited further classifying the at least two filtered images, and certainly not classifying each pixel

point of the at least two filtered images, as now recited in independent claim 1. Further, in contrast to the instant invention, in which the further classifying is performed by a group of different classifiers which operate in accordance with learned rules *to allocate, with evaluation number, said classified images to different object classes*, such that each classifier of said group of different classifiers operates *based on a characterizing vector of a respective filtered image* forming a direct input information for is respective classifier and wherein each different classifier works independently of any other classifier of said group of different classifiers, MURRAY requires a comparator for each classifier in order to fuse several classifiers.

Further, it is noted that each classifier of the instant invention is dependent upon the evaluation numbers at each pixel of the characterizing vector, such that a classifier in accordance with the invention is a mathematical function that transforms values (evaluation numbers) of the characterizing vector, i.e., an input to the classifier. In contrast, MURRAY simply provides an extraction system, which is limited to recognize and extract features from the extracted regions. Thus, it is apparent that MURRAY cannot even arguably form a characterizing vector from the filtered images for each pixel in the reduced image, in accordance with the instant invention.

Finally, Applicants note that MURRAY fails to teach or suggest deciding for each pixel point, on the basis of said merged images, *whether a pixel point of all remaining pixel*

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*points is still relevant and if so to which of said different object classes each relevant pixel point belongs.* In fact, Applicants submit that MURRAY fails to provide any teaching or suggestion of such a deciding feature, as recited in at least independent claim 1.

To address the deficiencies of MURRAY, the Examiner has cited LAWRENCE. However, as the Examiner has only indicated that LAWRENCE suggests using a characterizing vector, Applicants note that LAWRENCE fails to teach or suggest the remaining subject matter of at least independent claim 1 that has been identified as deficient in MURRAY.

Because both applied documents fail to teach or suggest the above-noted features of the invention, Applicants submit that no proper combination of the applied documents can render unpatentable the combination of features recited in at least independent claim 1.

Further, even with regard to the use of a characterizing vector, Applicants submit that the art of record fails to provide the requisite motivation or rationale for combining MURRAY and LAWRENCE in the manner asserted by the Examiner. In particular, Applicants submit that the signal processing of the MURRAY and LAWRENCE systems are distinct from each other, and the art of record fails to provide any teaching or suggestion that it would have been obvious to combine MURRAY and LAWRENCE in the manner asserted by the Examiner.

Moreover, even assuming, *arguendo*, that it were considered obvious to combine

MURRAY and LAWRENCE in the manner asserted by the Examiner (which Applicants submit it is not), Applicants note that as the feature vector of LAWRENCE is limited to image representation methods and is not a direct input to a classifier, such a combination of the applied art would not render unpatentable the instant invention.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of at least independent claim 1 and indicate that this claim is allowable.

Further, Applicant submits that claims 2, 3, 6, and 9 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further define the present invention. In particular, Applicant submits that no proper combination of MURRAY and LAWRENCE teaches or suggests, *inter alia*, providing a set of second criteria for performing said filtering step (c), as recited in claim 2; further comprising acquiring vicinity image data representing a vicinity of a respective relevant pixel point of a corresponding filtered image, and forming said characterizing vector from said vicinity image date, as recited in claim 3; further comprising using, as said group of different classifiers, a neural network capable of learning for performing said step of further classifying, as recited in claim 6; and further comprising representing recognized objects by pixel clusters in an image that represents a decision regarding said combined global evaluation while performing said deciding step, as recited in claim 9.

Accordingly, Applicants request that the Examiner reconsider and withdraw the

rejection of claims 1 – 3, 6, and 9 under 35 U.S.C. §103(a) and indicate that these claims are allowable.

2.     *Over Murray and Lawrence in view of Hutchenson*

Applicants traverse the rejection of claims 4 and 7 under 35 U.S.C. §103(a) as being unpatentable over MURRAY and LAWRENCE in view of HUTCHENSON et al. (U.S. Patent No. 5,465,308) [hereinafter "HUTCHENSON"]. The Examiner asserts that, while LAWRENCE does not specifically address a weighting system for different classes, HUTCHENSON discloses providing different weighting factors or evaluation number representing different classes of objects. Applicants traverse the Examiner's assertions.

Applicants note that HUTCHENSON fails to teach or suggest any of the subject matter noted above as deficient in the above-combination of MURRAY and LAWRENCE. Because these documents fail to teach or suggest each feature recited in at least independent claim 1, Applicants submit that no proper combination of these documents can render unpatentable the instant invention.

Further, Applicants submits that HUTCHENSON fails to teach or suggest the requisite motivation or rationale to render proper the Examiner's asserted combination of MURRAY and LAWRENCE. Accordingly, Applicants submit that the asserted combination of documents is improper and should be withdrawn.

Further, Applicant submits that claims 4 and 7 are allowable at least for the reason that

these claims depend from allowable base claims and because these claims recite additional

features that further define the present invention. In particular, Applicant submits that no

proper combination of MURRAY and LAWRENCE in view of HUTCHENSON teaches or

suggests, *inter alia*, wherein the allocation with evaluation number of said classified images

to different object classes comprises allocating certain evaluation numbers of said different

weighting factors to each relevant pixel point thereby marking each relevant pixel point with

regard to which of said different classes of objects the marked pixel point belongs, as recited

in claim 4; and further comprising selecting from relevant pixel points of said filtered images

characterizing or feature vectors representing features of said relevant pixel points of said

rough classifying, and forming rules for said neural network from said characterizing or

feature vectors, as recited in claim 7.

Accordingly, Applicants request that the Examiner reconsider and withdraw the

rejection of claims 4 and 7 under 35 U.S.C. §103(a) and indicate that these claims are

allowable.

3.    *Over Murray and Lawrence in view of Knecht*

Applicants traverse the rejection of claim 5 under 35 U.S.C. §103(a) as being

unpatentable over MURRAY and LAWRENCE in view of KNECHT et al. (U.S. Patent No.

4,881,270) [hereinafter "KNECHT"]. The Examiner asserts that, while neither MURRAY

nor LAWRENCE disclose the features recited in claim 5, KNECHT discloses such features,

and that it would have been obvious to include the same in the asserted combination of MURRAY and LAWRENCE. Applicants traverse the Examiner's assertions.

Applicants note that KNECHT fails to teach or suggest any of the subject matter noted above as deficient in the above-combination of MURRAY and LAWRENCE. Because these documents fail to teach or suggest each feature recited in at least independent claim 1, Applicants submit that no proper combination of these documents can render unpatentable the instant invention.

Further, Applicants submits that KNECHT fails to teach or suggest the requisite motivation or rationale to render proper the Examiner's asserted combination of MURRAY and LAWRENCE. Accordingly, Applicants submit that the asserted combination of documents is improper and should be withdrawn.

Further, Applicant submits that claim 5 is allowable at least for the reason that it depends from allowable base claims and because it recites additional features that further define the present invention. In particular, Applicant submits that no proper combination of MURRAY and LAWRENCE in view of KNECHT teaches or suggests, *inter alia*, said step of acquiring said vicinity image date comprises sorting said vicinity image data in a spiral pattern into a vector of coefficients, applying a rapid Fourier transformation to said vector of coefficients to form transformation coefficients and forming said characterizing vectors of an absolute value of said transformation coefficients, as recited in claim 7.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claim 5 under 35 U.S.C. §103(a) and indicate that these claims are allowable.

### *Application is Allowable*

Thus, Applicants respectfully submit that each and every pending claim of the present invention meets the requirements for patentability under 35 U.S.C. §§ 102 and 103, and respectfully request the Examiner to indicate allowance of each and every pending claim of the present invention.

### *Authorization to Charge Deposit Account*

The undersigned authorizes the charging of any necessary fees, including any extensions of time fees required to place the application in condition for allowance by Examiner's Amendment, to Deposit Account No. 19 - 0089 in order to maintain pendency of this application.
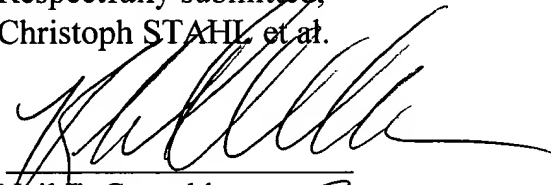
### *CONCLUSION*

In view of the foregoing, it is submitted that none of the references of record, either taken alone or in any proper combination thereof, anticipate or render obvious the Applicants' invention, as recited in each of claims 1 – 9. The claims have been amended to eliminate any arguable basis for rejection under 35 U.S.C. § 112. In addition, the applied references of record have been discussed and distinguished, while significant claimed features of the present invention have been pointed out.

Further, any amendments to the claims which have been made in this response and which have not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Accordingly, reconsideration of the outstanding Office Action and allowance of the present application and all the claims therein are respectfully requested and now believed to be appropriate.

Respectfully submitted,
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